查询SPX2431L供应商

Precision Adjustable Shunt Regulator

FEATURES

- Trimmed Bandgap to 0.5% and 1.0%
- Wide Operating Current 160μA to 100mA
- Extended Temperature Range: 0°C to 105°C
- Low Temperature Coefficient 30 ppm/°C
- Offered in TO-92, SOIC, SOT-23-3
- Replacement for TL431 and AS2431L
- Low Cost Solution

APPLICATIONS

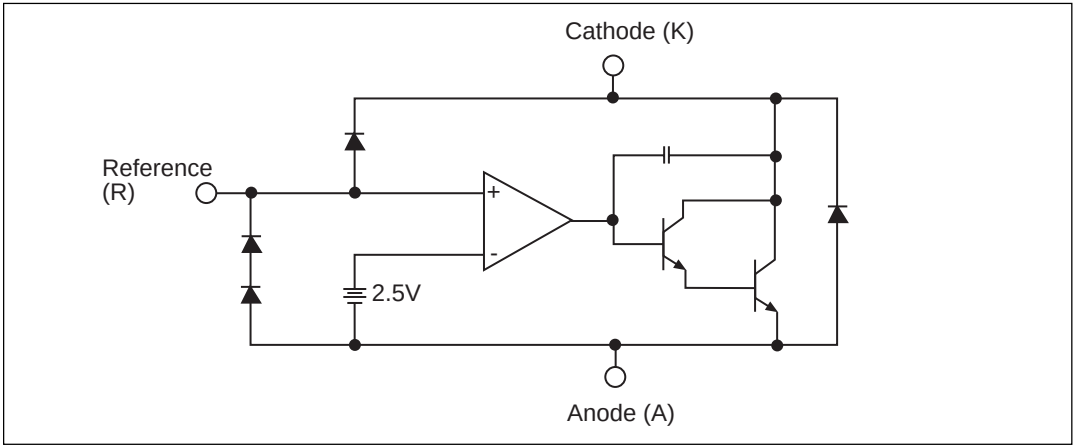
- Battery Operating Equipment
- Adjustable Supplies
- Switching Power Supplies
- Error Amplifiers
- Single Supply Amplifier
- Monitors / VCRs / TVs
- Personal Computers

DESCRIPTION

The SPX2431L is a 3-terminal adjustable shunt voltage regulator providing a highly accurate bandgap reference (0.5%) and extremely low operating current (100μA). The SPX2431L acts as an open-loop error amplifier with a 2.5V temperature compensated reference. The SPX2431L's thermal stability, wide operating current (100mA) and temperature range (0°C to 150°C) makes it suitable for a variety of applications. SPX2431LA tolerance of 0.5% is proven to be sufficient to overcome all the other errors in the system to virtually eliminate the need for trimming in the power supply manufacturer's assembly lines and contributes a significant cost savings.

In the standard shunt configuration, the combination of a low temperature coefficient, sharp turn on characteristics, low output impedance, and programmable output voltage makes this precision reference an excellent error amplifier. The SPX2431L is available in TO-92, SOIC-8, and SOT-23-3 package.

BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

Cathode-Anode Reverse Breakdown V_{KA} 20V
Anode-Cathode Forward Current, (<10ms) I_{AK} 1A
Operating Cathode Current I_{KA} 100mA
Reference Input Current I_{REF} 1.0mA
Continuos Power Dissipation at 25°C P_D
TO-92 ..... 775mW
SOT-23 ..... 200 mW
SOIC-8 ..... 750mW

Junction Temperature T_J ..... 150 °C
Storage Temperature T_{STG} ..... -65 to 150 °C
Lead Temperature (Soldering 10 sec.) T_L ..... 300°C

NOTE: Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

RECOMMENDED CONDITIONS

PARAMETER	SYMBOL	RATING	UNIT
Cathode Voltage	V_{KA}	V_{REF} to 20	V
Cathode Current	I_K	10	mA

TYPICAL THERMAL RESISTANCES

PACKAGE	0_{JA}	0_{JC}	TYPICAL DERATING
TO-92	160°C/W	80°C/W	6.3 mW/°C
SOT-23	575°C/W	150°C/W	1.7 mW/°C
SOIC-8	175°C/W	45°C/W	5.7 mW/°C

Typical deratings of the thermal resistances are given for ambient temperature >25°.

ELECTRICAL CHARACTERISTICS

Electrical characteristics at 25°C I_K = 10mA $V_K = V_{REF}$, unless otherwise specified.

PARAMETER	SYMBOL	FIGURE	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
				SPX2431LA			SPX2431			
Reference Voltage	V_{REF}	2 2	 T_J = 0°C to 150°C	2.490 2.469	2.503	2.515 2.536	2.470 2.449	2.495	2.520 2.541	V V
ΔV_{REF} withTemp.*	TC	2			0.07	0.20		0.07	0.20	mV/°C
Ratio of Change in V_{REF} to Cathode Voltage	$\frac{\Delta V_{REF}}{\Delta V_K}$	 3	V_{REF} to 10V 10V to 20V	-2.7 -2.0	-1.01 -0.4	 0.3	-2.7 -2.0	-1.01 -0.4	 0.3	mV/V
Reference Input Current	I_{REF}	3			0.7	4.0		0.7	4.0	µA
I_{REF} Temp Deviation	ΔI_{REF}	3	T_J = 0°C to 105°C		0.4	1.2		0.4	1.2	µA
Min I_K for Regulation	$I_{K(MIN)}$	2				160			160	µA
Off State Leakage	$I_{K(OFF)}$	4	V_{REF} = 0V, V_{KA} = 20V		0.04	500		0.04	500	nA
Dynamic Output Impedance	Z_{KA}	2	$f_z \leq$ 1kHz I_K = 0.16 to 100mA		0.15	0.5		0.15	0.5	Ω

Operating Range (T_J) = -40°C to 125°C.
**** See appropiate test circuit (Figure 2)***

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CALCULATING AVERAGE TEMPERATURE COEFFICIENT (TC)

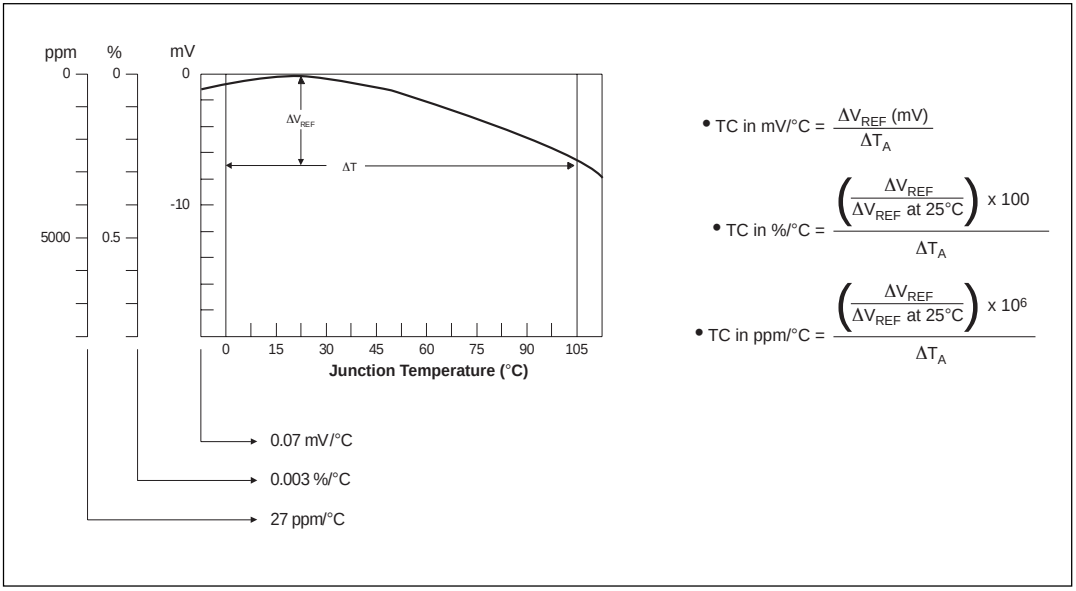

Figure 1. V_{REF} VS Temperature.

TEST CIRCUITS

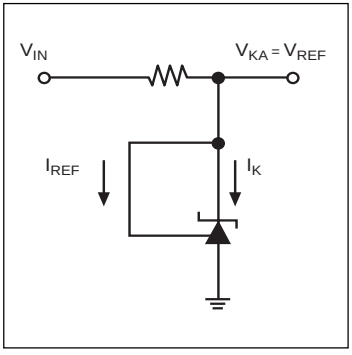

Figure 2. Test Circuit for $V_{KA} = V_{REF}$

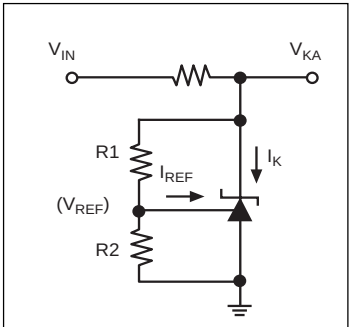

Figure 3. Test Circuit for $V_{KA} > V_{REF}$

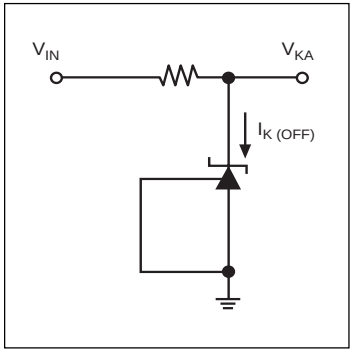

Figure 4. Test Circuit for I_{KOFF}

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TYPICAL PERFORMANCE CHARACTERISTICS

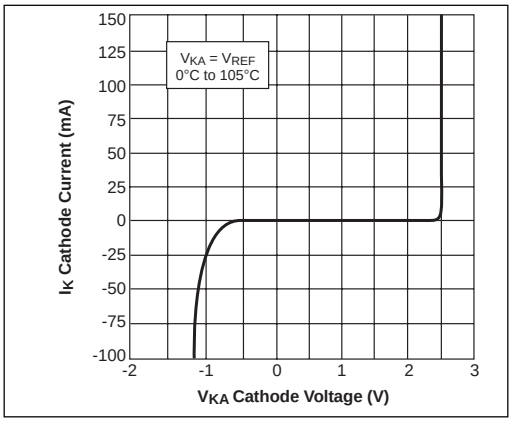

Figure 5. High Current Operating Characteristics

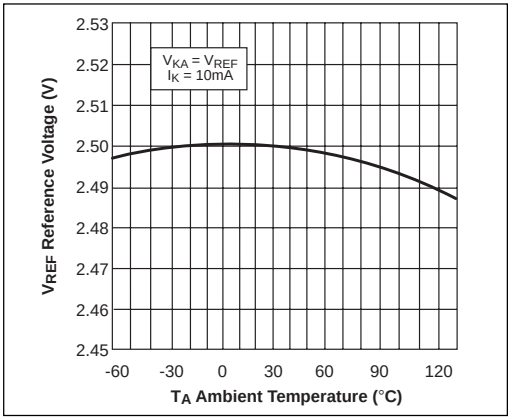

Figure 6. Reference Voltage VS Ambient Tempetature

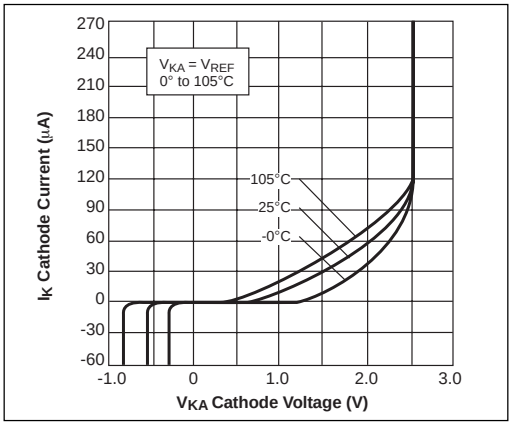

Figure 7. Low Current Operating Characteristics

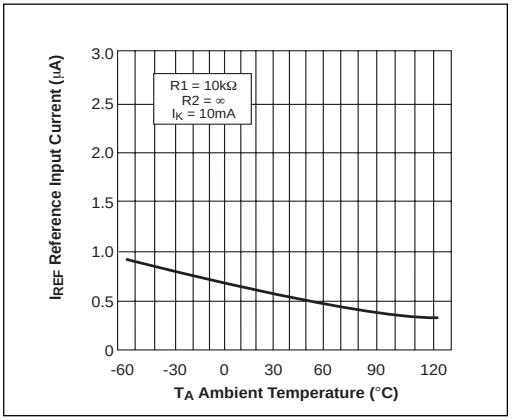

Figure 8. Reference Input Current VS Ambient Temperature

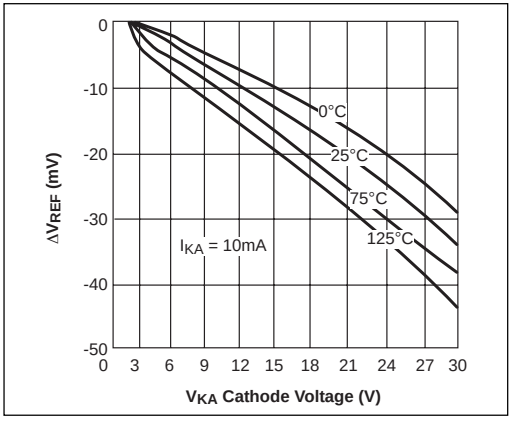

Figure 9. Reference Voltage Line Regulation VS Cathode Voltage and $T_{AMBIENT}$

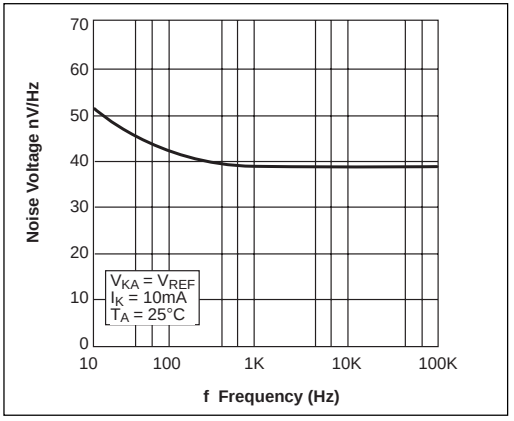

Figure 10. Noise Voltage VS Frequency

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TYPICAL PERFORMANCE CHARACTERISTICS (continued)

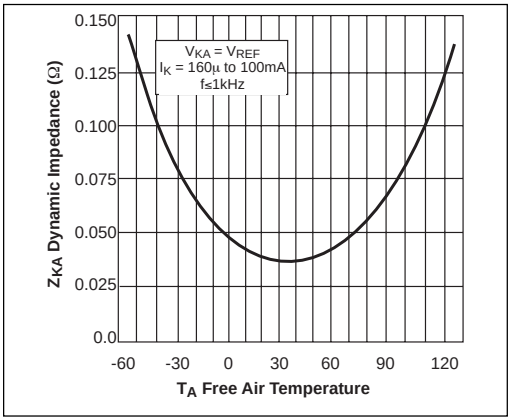

Figure 11. Low Frequency Dynamic Output Impedance VS $T_{AMBIENT}$

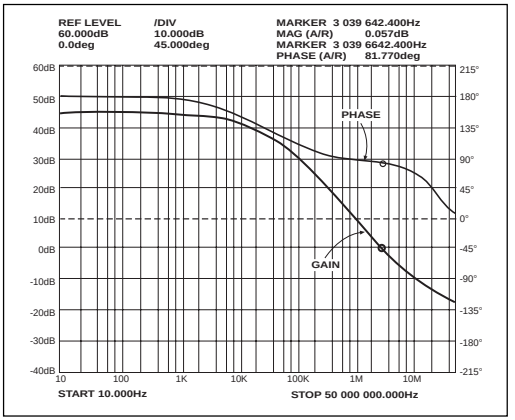

Figure 12. Small Signal Gain and Phase VS Frequency; I_K = 10mA, T_A = 25°C

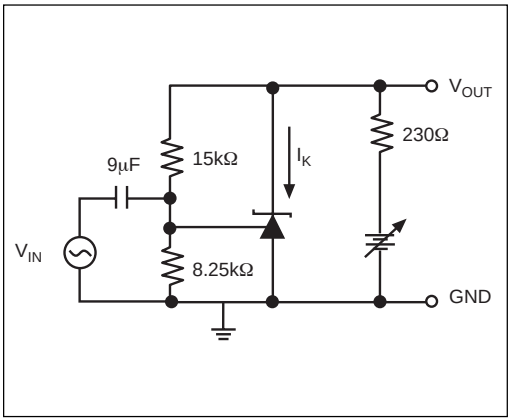

Figure 13. Test Circuit for Gain and Phase Frequency Response

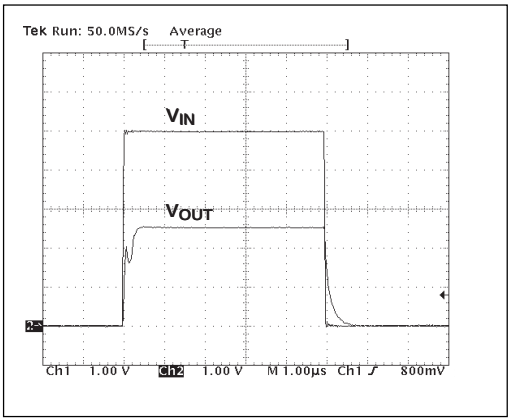

Figure 14. Frequency = 100kHz, I_K = 10mA, T_A = 25°C

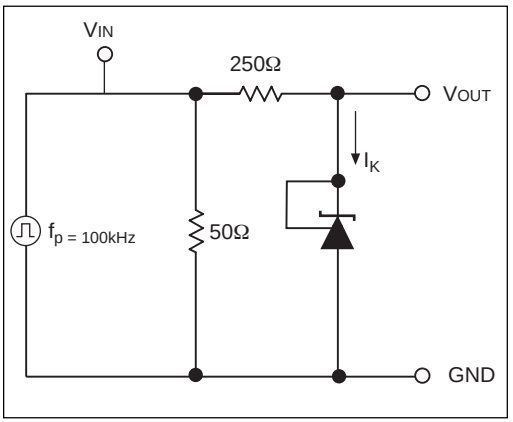

Figure 15. Test Circuit for Pulse Response

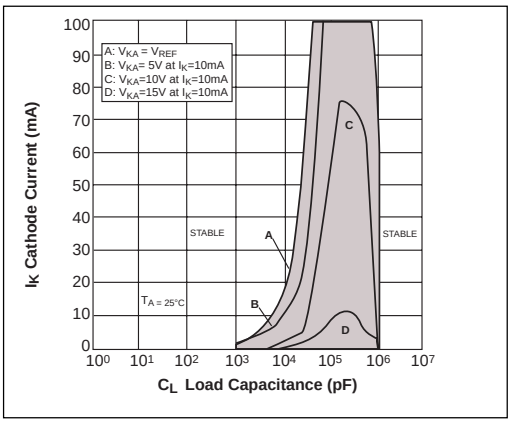

Figure 16. Stability Boundary Conditions

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TYPICAL PERFORMANCE CHARACTERISTICS (continued)

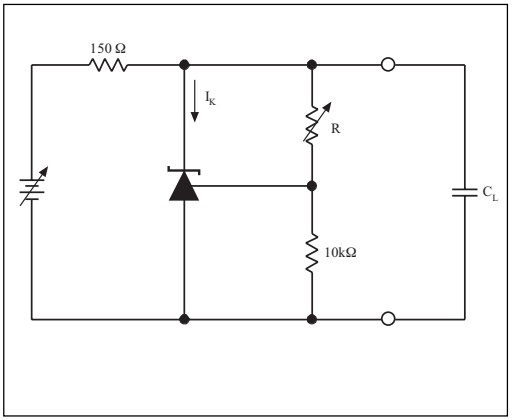

Figure 17. Test Circuit for Stability

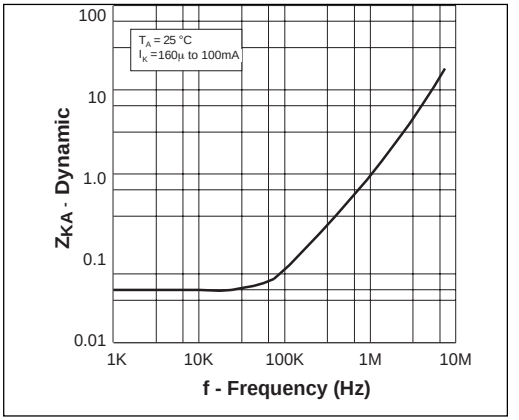

Figure 18. Dynamic Output Impedance T_A = 25°C, I_K = 160µA to 100mA

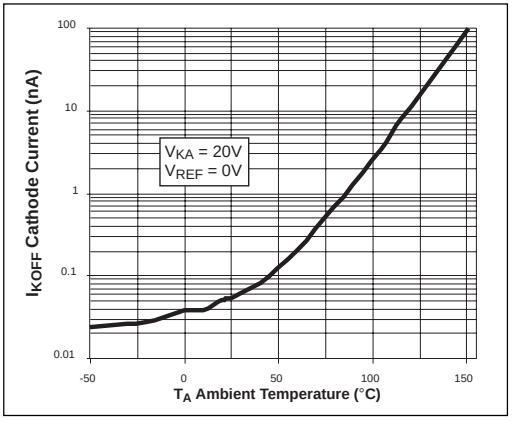

Figure 19. Off State Leakage

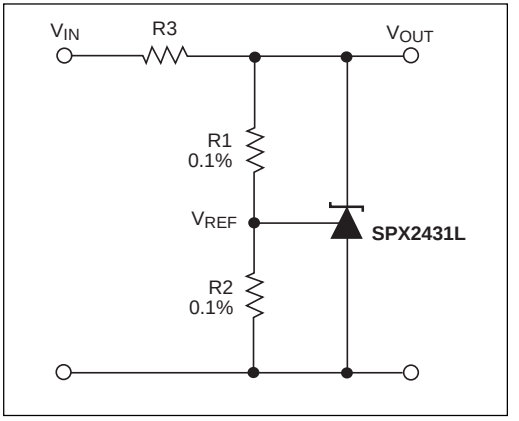

Figure 20. Shunt Regulator V_{OUT} = (1+R1/R2)V_{REF}

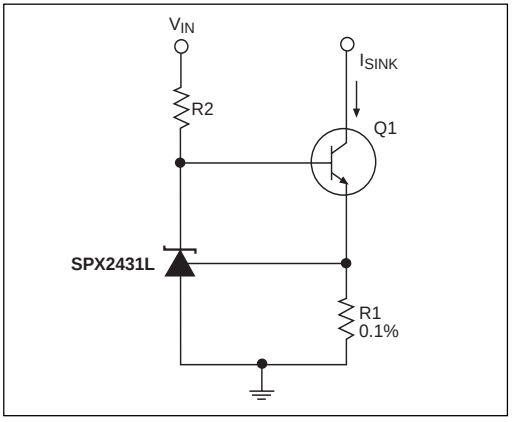

Figure 21. Constant Current Sink, I_{SINK} = V_{REF}/R1

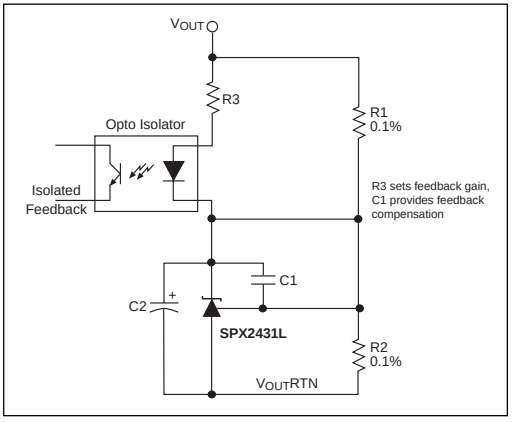

Figure 22. Reference Amplifier for Isolated Feedback in Off-Line DC-DC Converters

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TYPICAL PERFORMANCE CHARACTERISTICS (continued)

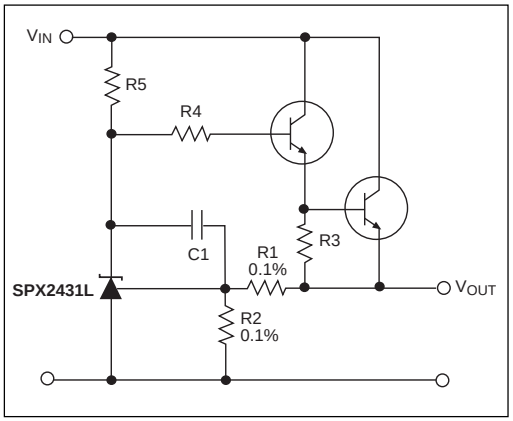

Figure 23. Precision High Current Series Regulator
$V_{OUT} = (1+R1/R2)V_{REF}$

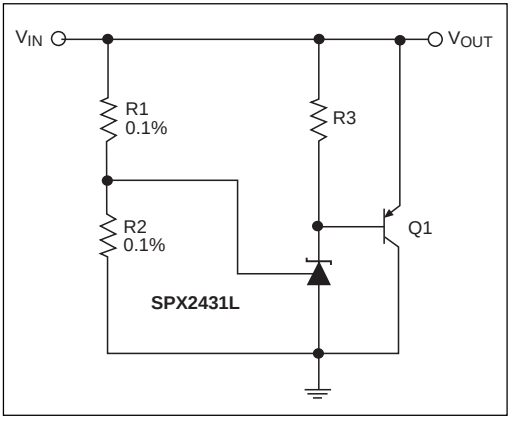

Figure 24. High Current Shunt Regulator
$V_{OUT} = (1+R1/R2)V_{REF}$

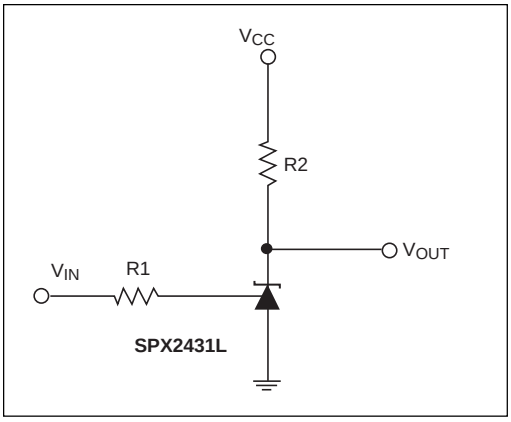

Figure 25. Single Supply Comparator with Temperature Compensated Threshold. V_{IN} threshold = 2.5V

**** Resistor values are chosen such that the effect to I_{REF} is negligible.***

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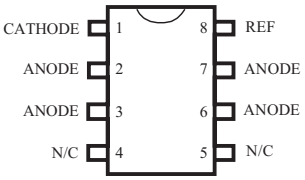
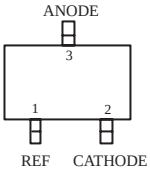
PACKAGES

8-Pin Surface Mount (S)



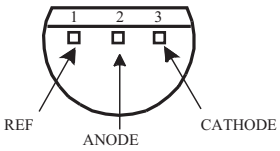
Top View

SOT-23-3 (M)



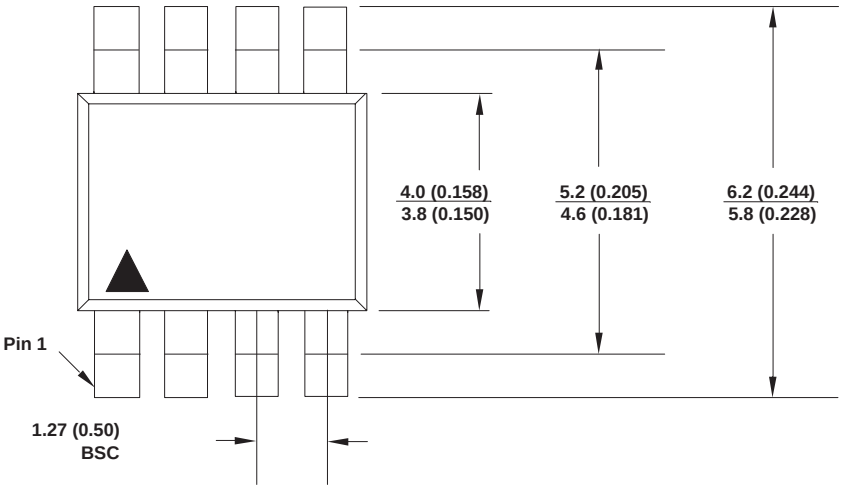
Top View

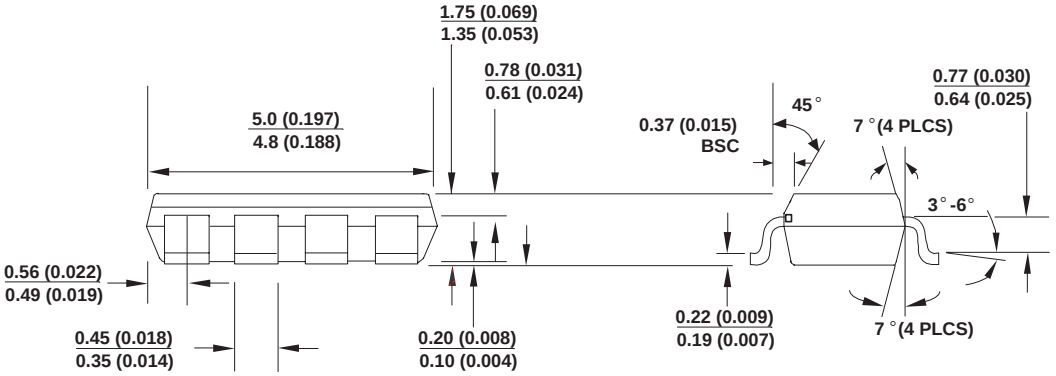
TO-92 (N)



Bottom View

PACKAGE: 8 PIN PLASTIC SMALL OUTLINE (SOIC) (NARROW)





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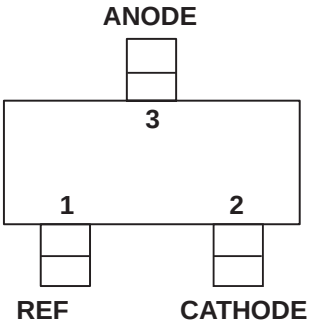
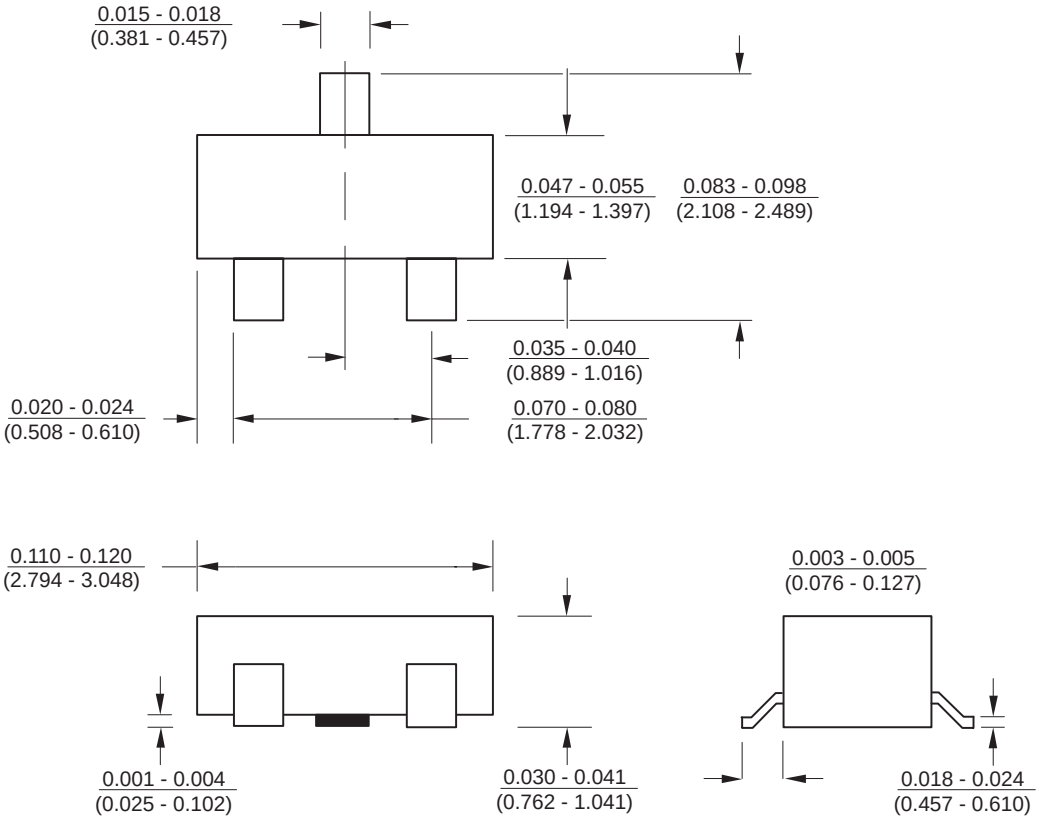
PACKAGE: SOT23-3 (M)



Top View



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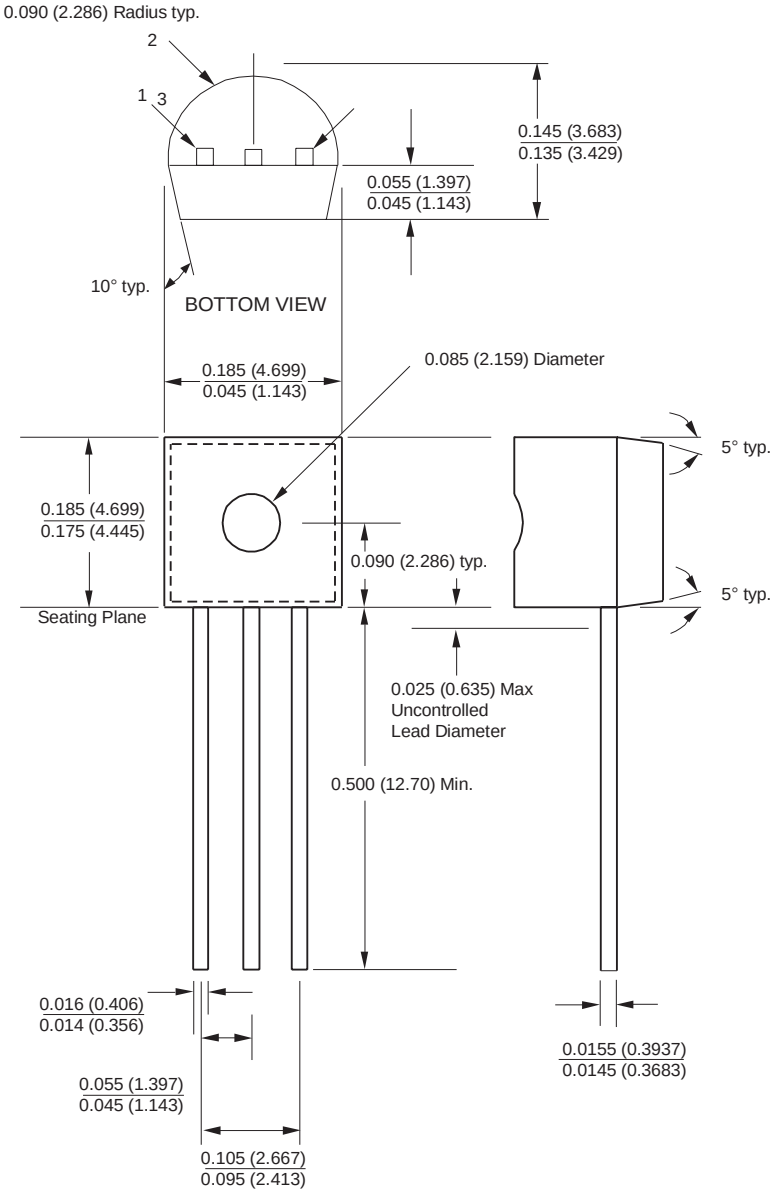
PACKAGE: TO-92



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ORDERING INFORMATION

PART NUMBER	ACC	OUTPUT VOLTAGE	PACKAGES
SPX2431LAM	0.5%	2.503V	3-Pin SOT-23
SPX2431LAS	0.5%	2.503V	8-Pin SOIC
SPX2431LAN	0.5%	2.503V	3-Pin TO-92
SPX2431LM	1.0%	2.495V	3-Pin SOT-23
SPX2431LS	1.0%	2.495V	8-Pin SOIC
SPX2431LN	1.0%	2.495V	3-Pin TO-92

Sipex Corporation

SIGNAL PROCESSING EXCELLENCE

Sipex Corporation

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